

# The Mining Journal

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## Not Worth a Mass ?

"PARIS," said Henri IV, "is worth a mass." Whatever the merits or demerits of this sentiment morally or spiritually, it is historical fact that this tolerant and practical attitude—or, if you prefer, the deplorable flexibility of the royal conscience—brought peace and stability back to France, thus benefiting a large number of sorely-stricken people.

Dr. van Rhijn, the South African Minister for Economic Affairs, is less accommodating in his views, for he considers that Paris—in this case South African industry—is not worth a mass. The Government, he roundly declares, is not prepared to sell its policy and principles for overseas investment.

One can but deplore that such admirable single-heartedness of purpose is not devoted to a less dubious cause. The intransigence of the Minister's conscience is unlikely to commend itself to the industrialists and investors whose own interests are being sacrificed to a faith which they do not share. Martyrdom for someone else's religion is indeed a singularly unrewarding fate, which few overseas investors will be disposed to risk.

## Canada Changes Horses

THE Canadian Prime Minister, Mr. Louis St. Laurent, has resigned, following the defeat of his party in the General Election last week. Mr. John Diefenbaker, leader of the Progressive Conservative Party, has been asked to form a Government.

Thus ends 22 years of Liberal predominance, during which Canada prospered exceedingly and made spectacular strides in the exploitation of its natural resources, which are unsurpassed. The sweeping swing of the political pendulum appears to be not so much an expression of censure or dissatisfaction with Mr. St. Laurent's team as a reminder that the essence of democracy is the right to sack the political management, even if for no better reason than because people are tired of seeing the old familiar names in the newspapers day after day, year after year. After the long period of Liberal rule Canada is very understandably changing horses, but she is certainly not doing so in mid-stream. And she is among the few countries in the enviable position of being able to do so without any major reorientation or reversal of policy.

Apart from the uncertainties introduced by a minority Administration, with the possibility of another General Election in a few months, the outlook, broadly, is for the mixture as before only in perhaps rather stronger doses and with the possibility that attempts will be made to reduce the present tendency to rely rather heavily on a single chemist for one of the principal ingredients—capital.

Last year Canadians spent over \$1,000,000,000 more on U.S. goods than they received from goods exported to the U.S. At the end of last year the amount of U.S. capital invested in Canada totalled about \$11,500,000,000. This was an increase of 11.6 per

cent over 1955 and represented about 76 per cent of total foreign investment in Canada during 1956. In order that this picture may be seen in correct perspective, it should be pointed out that Canadians themselves own 75 per cent of their industries, the U.S. share being around 18 per cent, with the balance supplied by other foreign investors.

What irks many Canadians is the high concentration of U.S. capital in a few industries, and key industries at that. At present U.S. investors own about three-quarters of Canada's oil and gas industries, and are financing more than half the mining undertakings. Americans also own more than two-fifths of the Dominion's manufacturing concerns, many of which are either wholly-owned subsidiaries of U.S. firms or are U.S. controlled.

This situation was commented upon in the Preliminary Report of the Gordon Commission, in which it was stated that many Canadians were worried about such a large measure of economic decision-making being in the hands of non-residents or in the hands of Canadian companies controlled by non-residents.

Fears that Canada might ultimately become economically a U.S. satellite are, of course, partially responsible for the readiness of the Dominion's commercial and industrial leaders to foster trade with the U.K., thereby presenting British exporters of mining machinery and equipment with opportunities which might well become even more favourable under the new regime.

There also appears to be growing support for the view that the development of Canada as the free world's greatest source of raw materials, while highly advantageous to U.S. industry, is not in the best interests of the Dominion itself. Under the Liberal regime considerable progress has, in fact, taken place in the establishment of expansion of industries based on indigenous materials. Further processing of materials in Canada is to-day being widely urged, not only as a means of industrializing the country but also to decrease present dependence on the U.S.

The advent of a Conservative Administration—if, indeed, the new government is in a position to follow its own inclinations—may be expected to result in closer ties, both politically and economically with Britain and possibly in greater tariff protection and tax incentives for Canadian industries, the primary objective being reduced dependence on the U.S.

Whichever political party is in the saddle, however, it may be taken as certain that the momentum of Canada's progress will not be allowed to diminish and that nothing will be done to discourage investors in other countries from contributing to the immense sums necessary to finance the immense programmes of further development and expansion which can be anticipated in the years ahead.

#### WIDENING INTEREST IN LIBERIA

Great changes are taking place in the Republic of Liberia. The development of this interesting West African country began in earnest after the end of the Second World War. It went rather slowly at the beginning and even to-day has not gained full momentum, but its pattern is now clear. Liberia is still essentially a one-crop country (over three-quarters of her exports by value consist of rubber), but the exploitation of her valuable deposits of high-grade iron ore is increasing and the development of her other resources is being pushed ahead as rapidly as circumstances permit.

Many European interests are joining in the exploitation of the country's mineral, forest and agricultural wealth. The U.S. has the biggest financial investment in the country,

but German, Swedish, Spanish and Italian interests are earning millions of dollars a year.

In 1956 the Liberia Mining Co. produced 2,000,000 tons of iron ore of 68 per cent content from its Bomi Hills mine, and exports for the year were valued at \$8,100,000. The Bomi Hills deposit is estimated to contain 300,000,000 tons of ore of high- and low-grades.

The existence of other large deposits at Putu and in the Nimba Forest area, both in the northern part of the country, has been verified by the Liberian-American-Swedish Minerals Co., a joint Liberian-American-Swedish enterprise, which is under Swedish management. A German concern has reported another discovery from the south.

A concession agreement dated June 27, 1956, between the Columbia-Southern Chemical Co. and the Government of Liberia gives the American firm—a subsidiary of the Pittsburgh Plate Glass Co.—the right to search for titanium ores and other minerals and to carry on mining operations, if such minerals are found. It was announced last December that Columbia-Southern were embarking upon extensive explorations under the agreement and that technicians and independent consulting geologists were en route to Liberia with the necessary equipment and supplies.

Other minerals also exist, but it is not yet known whether the deposits are of commercial value. Great interest is being shown in the diamond-bearing area running parallel with the Loffa River, but so far no important deposits have been discovered.

Imports into Liberia are free from quota restrictions, points out the British Embassy at Monrovia in a report published in the *Board of Trade Journal* of June 14, 1957, and the market is a dollar one; competition is therefore keen. If British exporters are sending representatives to West Africa, it should be well worth their while to spend some time in Monrovia.

#### U.S. LONG-RANGE MINERAL PROGRAMME

The long-awaited Long-Range Mineral Programme requested more than a year ago by Congress from the Secretary of the Interior, finally has been submitted. As expected, it gives first consideration to lead and zinc, with two alternate proposals.

The first is retention of existing tariffs with excise taxes as follows, when prices during three calendar months fall below the stated figures :

Lead : 1 c. if price below 16 c. per lb.
2 c. if price below 15 c. per lb.
Zinc : $\frac{1}{2}$ c. if price below $13\frac{1}{2}$ c. per lb.
$1\frac{1}{2}$ c. if price below $12\frac{1}{2}$ c. per lb.

The excise tax will be suspended when average prices over three calendar months reach 16 c. for lead and  $13\frac{1}{2}$  c. for zinc and the existing tariffs will be removed when a three-month average shows 17 c. and  $14\frac{1}{2}$  c. respectively.

The second alternative proposes elimination of present taxes and a differential scale, based on an average price over three calendar months :

Lead : 1 c. when price is 16 to 17 c.
2 c. when price is 15 to 16 c.
Tax suspended when price above 17 c.
Zinc : $\frac{1}{2}$ c. when price $13\frac{1}{2}$ to $14\frac{1}{2}$ c.
$1\frac{1}{2}$ c. when price $12\frac{1}{2}$ to $13\frac{1}{2}$ c.
2 c. when price below 12 c.
Tax suspended when price above $14\frac{1}{2}$ c.

It is further proposed to extend existing support to beryl,

columbium-tantalum and chromite until new programmes under consideration go into effect and to build an asbestos mill to serve deposits on two Indian reservations in Arizona. As general aid to the industry, "continued and intensified research and technical assistance" to improve technology, assistance to private industry in exploration and development (continuation of DMEA programme) and a continuous review of tax laws as they affect the mining industry.

Above, in brief, are the recommendations made to Congress. They are much along the lines suggested last autumn in a speech by Mr. Fred Seaton, Secretary of the Interior, before the American Mining Congress. What Congress will do to them is something else again but it is understood that they were arrived at after long discussion between the Departments of State, Treasury and Interior. Probably the big fight will come over the tariff phases but since the great advance on industrialization of the South the Democratic Party has modified its former adamant opposition to tariffs, and it is probable that, when the matter comes to a vote, party lines will be largely disregarded.

It is to be noted that no mention has been made of import quotas, which were supposed to be a likely alternative to tariffs. There is no inkling as to when Bills to implement the programme will be introduced in Congress and it will be a long time after that before final action is taken.

#### "GROWING" ROCKS IN THE LABORATORY

In a study designed to shed new light on conditions under which natural minerals and rocks are formed, scientists at Pennsylvania State University, United States, are making synthetic mineral specimens in the laboratory. According to Dr. MacKenzie L. Keith, professor of geochemistry, who is directing the research, one clue to understanding the conditions under which natural minerals are formed is to determine the temperatures at which they crystallize. Synthetic minerals must be produced in the laboratory under carefully controlled conditions and their composition determined to provide a scale of variation which can be used for investigating mineral deposits. The temperature at which synthetic quartz crystals are formed can be measured by determining the ratio of the isotopes of stable elements in the specimens and in the liquid from which they grew.

Dr. Keith has chosen oxygen as the element with which to work because oxygen is the most abundant and widespread element in common minerals, and it has several isotopes which are appreciably different in mass. The oxygen is extracted from crystals grown at varied temperatures and the ratio of heavy to light oxygen isotopes is measured. Experiments have shown that at high temperatures there is little difference between the amounts of heavy and light oxygen isotopes in the quartz crystals and the source liquid. However, at lower temperatures, progressively greater differences appear. The geochemistry researchers are constructing a temperature scale, also known as a geological thermometer, by recording these differences.

The crystals are grown in the laboratory by simulating as closely as possible the pressure and temperature conditions in part of the earth's crust. Pressures up to 30,000 lb. p.s.i. have been used and temperatures have exceeded 600 deg. C. The crystals are grown at different temperatures and the effect of the temperature on their oxygen isotope ratio is measured. The oxygen is extracted from the crystals by reaction in a vacuum furnace. Samples of the extracted gas are then put into a mass spectrometer, a machine that separates the heavy and light oxygen isotopes and measures their amounts electronically.

Dr. Keith and Dr. R. N. Clayton, assistant professor of geochemistry, who is also working on the project, hope their research will establish a quantitative basis for the use of stable isotope ratios as indicators of the conditions needed for the formation of minerals and rocks. They feel the study may prove useful as a guide for finding mineral deposits and for understanding some of the complex problems about the history of the earth.

#### RESEARCH ON CORNISH MINERAL DRESSING

In a recent lecture to the Cornish Institute of Engineers, Dr. C. R. Burch, University of Bristol, drew attention to the very great benefits which might be expected from more extensive research on the mineral dressing problems presented by Cornish ores.

Supporting his contentions with examples drawn from another industry, he recalled that 34 years ago, when he joined its research department, Metropolitan-Vickers had an annual turnover of about £3,000,000, of which £120,000 a year was ploughed back into research. Much of the research was of an *ad hoc* or routine character, but about £20,000 per annum was spent on long-term, fundamental investigations, not directly or immediately related to the company's operations. This work, it was hoped, would lead to new scientific knowledge—knowledge of the behaviour of electrons and ions, of the ordered and disordered arrangements of particles in crystals, and of high vacuum phenomena—which not immediately, but in perhaps ten years' time, might be expected to result in new processes or new apparatus which the factory could use or make.

The gains that have arisen afford convincing evidence that long-term research by a suitably qualified scientist, courageously backed over periods of the order of ten years, can be an extremely profitable investment. That the Metrovick group have certainly found it so is indicated by the fact that, just after the war, the parent company—Associated Electrical Industries Ltd.—decided to create a special laboratory for long-term fundamental research and to devote to this long-term research no less a sum than £500,000 per annum.

In the light of experience in the electrical and other industries, the lecturer stressed the urgent necessity for increasing the funds available for mineral dressing research, which, he considers, should be undertaken not only at Bristol but also at other centres. Mineral dressing at Bristol, it appears, is limited not by ideas but by the time available for following them up.

Dr. Burch maintains that the price of continued prosperity in any industry to-day is the continual and ceaseless search for new knowledge, and that this is peculiarly true of the extractive industries. In fact, he regards more extensive mineral dressing research as absolutely essential for the continued existence of the metalliferous mining industry in England at even its present level of prosperity.

The Cornish mining companies, it is emphasized, are not making a complete extraction. The fact that this may also be true of tin mines in other countries is beside the point, since other companies' losses will not put back into the lodes of Croft or of Geevor the values that the tailings are carrying away.

Given a reasonable possibility, as can scarcely be disputed, that new knowledge might lead to a significant reduction in present loss of values in tailings, it would appear that a strong case has certainly been made out for increasing the proportion of receipts allocated by U.K. mining enterprises to long-term mineral dressing research.

*The time has come, the Mech.E.'s said,  
To talk of television;  
Of loads and cells and gas flow rates,  
And thorium and fission;  
And why a nuclear pile gets hot,  
And what makes a technician.*

**T**HERE could be no more eloquent pointer to the forward-thinking of mining technologists than the addresses delivered to the Association of Mining, Electrical and Mechanical Engineers at its annual general meeting in London on June 19-21. As our title implies, the proceedings were characterized by a vigorous and constructive interest in the latest developments in every field of technological progress. The papers were by no means confined to the impact on the mining industry of the latest developments in instrumentation and electronics, but also showed a lively awareness of the shape of things to come.

## Atomics, Television and Pit

One of the industry's most basic and most urgent requirements is, of course, the provision of an adequate supply of skilled technicians and electricians capable of operating and maintaining the complex and expensive machinery used underground at the present day. As was to be expected, the problems of technical training were touched upon by Mr. J. E. Ridley in the course of his presidential address.

Mr. Ridley considered that, in the light of more than 18 months' operation of the new Regulations, experience to date should be reviewed. He agreed with the statement in Mr. Morton's presidential address last year that initially the level of attainment had been set too high, and that the effect of a higher school-leaving age and existing training schemes should have been allowed to evolve gradually to a higher standard. He suggested that immediate thought should be given to the following factors :

(1) That the Mining Qualifications Board requirements for a technician Class I should be reviewed and a lower standard set for, say, the next five years;

(2) That apprentices should not attend continuation classes on the part-time day-release basis if the teaching period in that day is from 9 a.m. to 9 p.m. Better results have been obtained when they attend one day from 9 a.m. to 4.30 p.m., or thereabouts, and on another day attend an evening class;

(3) That pit-trained electricians and mechanics who were born after January 1, 1926, and who did not work at the collieries during the vital period for a Service Certificate, should be interviewed by the Mining Qualifications Board with a view to granting them a Class II Certificate of competency;

(4) That there should be instituted a continuous course of study for all apprentices, such that those who passed the first three years would qualify Class II, and those who had the ability to continue would obtain Class I after a further two years, and eventually an engineer's qualification if, following this, they then took an advanced course of two to three years' duration.

In the course of his address the president made some interesting observations on closed-loop television equipment which, he stated, had been used experimentally in an endeavour to obtain accurate decking for winders by direct observation at underground insets, the difficulty being to find the correct position for the camera. If closed-loop television were to be adopted for this purpose, the camera position would have to be set back to view the cage approach to the mark for about 6 ft. in either direction.

The N.T.S.C. system of colour television was described by Mr. V. J. Cooper, who also discussed the properties of human vision and perception which have been exploited by the engineer and traced the development of our present-day black and white television system.

To-day, for a few hundred pounds, he pointed out, we can use remote eyes to observe continuously and instantaneously processes that cannot be viewed directly. In the industrial field remote mechanical operations can be assisted by these remote eyes, and it has recently been demonstrated that stereovision giving three-dimensional remote vision can be of even greater assistance, this system using the same basically simple equipment. More recently, television cameras have been planned to observe the inside of the atomic pile, inaccessible of course, to human beings. In

## Measurements

colour television, an additional series of human visual properties are exploited.

Dr. L. C. Tyte described various instruments developed by the Mining Research Establishment of the National Coal Board. Most of them, while essential tools for providing measurements relevant to mining research problems, are also of immediate practical value to engineers engaged in general or special duties throughout the industry. Among them are a micromanometer for measuring accurately small differences in atmospheric pressure; a profilograph for determining the periphery and cross-sectional area of a road section; a romometer for measuring the relative movement of roof and floor as well as the convergence; the M.R.E. load cell type 403, which has been designed to measure compressive forces on pit props; and a dynamometer for measuring the tension in roof-bolts.

For the ninth "W.M. Thornton Lecture", Dr. T. E. Allibone took as his subject "The Impact of Nuclear Energy on the Twentieth Century". He gave figures from which it can be seen fairly clearly that generation costs will fall to values fully competitive with coal costs in a relatively short time. It appears that the large programme of nuclear generation in 1960 will be started on about an even cost with coal. With the passage of years the real capital cost of uranium stations is likely to fall faster than the cost of coal stations, and the initial cost of fuel loaded into the reactor will certainly fall as we learn to design reactors having a higher specific heat loading. This change will also reduce the annual replacement cost of fuel, and if fuel elements can be recycled cheaply, the total energy which can be obtained from them may be considerably increased above the present figure. In these ways the gas-cooled reactor of the same essential design as we see in Calder Hall may in ten years' time be producing electricity well below the cost of the coal-fired station and, possibly, the advantage will be doubled in the next decade.

## Brazil's "El Dorado" of Iron

**I**N days of old, prospectors, adventurers and soldiers of fortune sought vainly for the mythical El Dorado—the land of gold. Nowadays, when gold is pegged at a price bearing little relation to its real value, other metals are liable to be more rewarding and few more so than iron, provided that it can be found in deposits containing many millions of tons of high-grade ore, situated in localities which are sufficiently accessible to permit economic exploitation.

Brazil claims to have the world's biggest and best deposits of iron ore, with an overall average of 69 per cent. Among them is one of the most fabulous geological confirmations on earth, the iron ore mountain at Itabira, where the ore is so easily accessible that surface mining accounts for almost the total output. Having regard to its seemingly limitless potentialities as an earner of dollars and sterling, Itabira might well be described as an El Dorado—a mountain of golden iron.

### Iron's Role for the Future

In discussing future prospects for this industry, the *Brazilian Bulletin* recalls that only a few months ago, when President Kubitschek first announced his vast development programme, one of the most important projects he mentioned was the raising of Brazil's production of iron ore from some 2,500,000 tons yearly to 10,000,000 tons. This was to be substantially, if not wholly, achieved during his short term of office. This part of the President's plans was received abroad with incredulity and the pronouncement that this was, at best, a very far-distant goal.

Now it seems that Brazil will once again confound her critics. For her major iron-ore mining company, the Federal-controlled Companhia Vale do Rio Doce, has reached agreement with an American group to transform itself into a mixed Brazilian-American company which will quadruple its annual output to about 10,000,000 tons with a new investment of \$100,000,000.

Companhia Vale do Rio Doce, responsible for nearly all Brazilian exports of the mineral, is at present developing the unique iron ore mountain at Itabira. Since output is largely a question of transport, road and rail facilities are being increased, and so is the already extensive network of conveyor belts.

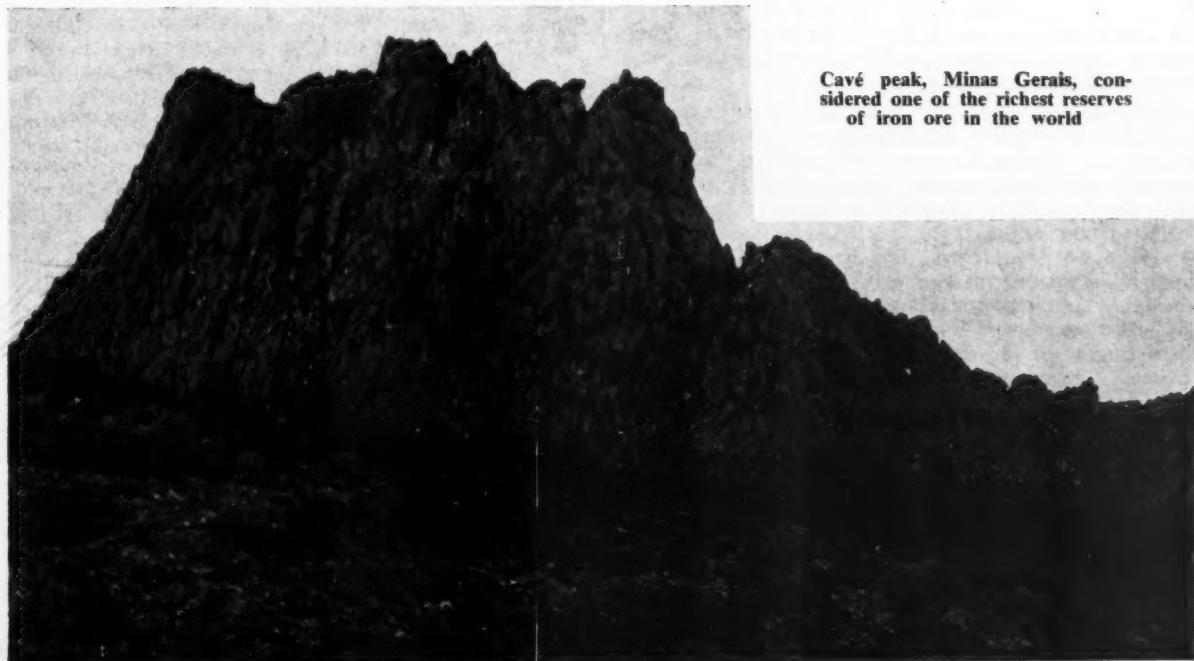
The American group which has been negotiating with Companhia Vale do Rio Doce includes Nelson Rockefeller and Associates, Cyrus Eaton and Associates, the Cleveland Cliffs Company and the Chesapeake and Ohio Railway Company. To make up the \$100,000,000 needed, the group may need to draw heavily on Export-Import Bank money and for this the American Government have already signified their approval.

The basis on which discussions are taking place envisages the conversion of the Companhia Vale do Rio Doce into a joint Brazilian Government-Private American Enterprise undertaking, with the Brazilian side retaining control with at least 51 per cent (probably 58 per cent) of the shares of the new stock.

### Large-Scale Investment

The expansion work in which the mining company is already engaged foresees an increase of its annual production to 3,000,000 tons during 1957. The \$100,000,000 additional investment will be needed to raise that figure to a production of 10,000,000 tons by 1960 or 1961.

The new money would be invested in expanding the mine operations, improving the company's 360-mile-long railway, which carries the ore from the interior of the country at Itabira to the Atlantic Coast port of Vitória, and enlarging the port so that it will be able to handle a greater volume. Another important part of the development programme involves enlargement of the capacity of the port, which at present is limited to about 6,000,000 tons annually. Consideration is also being given to the idea of building a new port at Santa Cruz, north of Vitória.



# Furnace Designs and Smelting Methods For Non-Ferrous Materials

**S**OME of the more unique furnace designs and smelting methods for handling non-ferrous materials have shown a wide divergence in the methods of construction and procedure generally. With water-jacketed cupolas, it is sometimes a difficult matter to attain high melting temperatures, as there are various materials in the charges which absorb heat, while too much trouble is sometimes involved in maintaining a close control of the conditions. In some cases, electric furnaces are resorted to, but where they are too costly to operate, or for other reasons are not considered suitable, advantage has been taken of a further expedient.

This comprises an electrically-heated forehearth for the small blast-furnace, or water-jacketed cupola. Connection is made by a self-slagging spout, through which the molten material runs in a constant stream into the forehearth. While the slag may be removed from the metal dealt with, on its way through the spout, provision is made for conversion of the type of slag. For example, on its passage through the spout, the slag may be acid in character, whereas in the forehearth this may be converted to a basic slag. There is no need to instal a transformer, since three-phase current of 110 volts is usually available in some quarters. The power consumption is relatively low, since only a small amount of extra heat need be added.

The electrically-heated forehearth offers provisions for a number of adaptations where it is desired to alter the character of the material before it finally emerges to be tapped. In earlier practice, it was customary to link-up water-jacketed cupolas with settlers, wherein reactions could be furthered. Some of these reactions were not necessarily of lengthy duration, and it is here that this forehearth with self-slagging spout could be advantageous.<sup>1</sup>

The smelting of copper ores in electric furnaces which are specially constructed of the resistance types, uses the

slag overlying the matte as the resistance medium, while electrodes of the Soderberg variety, 56 in. in diameter, supply the current.

With a steel shell, the bottom and walls are of magnesite brick, the arched roof is "chamotte", and the water-cooled jackets (of copper) are located at the four holes for tapping matte. This cylindrical hearth is 13 ft. in height, and 33 ft. in dia.

The power load is 7,000 kW., at 90 to 110 v. between the electrodes, and use is made of three-phase 50 cycle current. The original 4 per cent copper ore is dressed by flotation, to give concentrates assaying from 22 to 24 per cent copper. This has a fineness allowing 80 per cent to pass through the 200-mesh screen, and the material is dried in a rotary kiln to from 4 to 5 per cent moisture. Raw concentrates, to the extent of 38 per cent of the charge, are mixed with roasted concentrates representing 35 per cent while addition is made of 11 per cent lime, and 6 per cent quartz sand, while foul slags, flue dust, etc., make up the remaining 10 per cent.

## Extending Scope of Converter

This continuous charging and operating furnace handles from 250 to 300 tons daily to provide matte, slag and gas, as in the reverberatory process. The slag contains 0.3 per cent copper, and the matte carries 45 per cent copper, which is blown to 99 per cent copper in the converter in the usual manner.<sup>2</sup> An entirely different approach to the foregoing method of smelting is undertaken by using the converter more in the manner of a combined furnace and converter.

Besides handling impure copper, this makes provision for dealing with metalliferous materials primarily made up of copper, but also containing other heavy metals. The hot blast so obtained, assists in the removal of the more volatile metals, lead, tin and zinc, from the former, as the cold metal initially charged has to melt from above, and pass through the glowing coke. The results do not compare economically with alternative arrangements of keeping the mass heated while blowing proceeds, the copper product is crude, and contains variable proportions of lead, etc.

Nearly one ton of coke is consumed in handling a 5-ton charge, and instead of the oxides passing off to the baghouse as in other instances, they are liable to enter the slag to the extent of some 30 per cent. Hence the slag is so rich that the lot has not merely to be returned to the blast furnace for re-smelting, but means that these by-products are passing around the smelting cycle a second time. (Experimental runs of matte of the normal variety,

*By C. C. Downie*

as carried out elsewhere, revealed that an excessive amount of coke appeared to link-up with the molten material, and accounted for an even larger proportion of slag than where purely metallic materials were smelted.)

Although operated at the present time, this system of blowing appears inadequately to deal with the oxides, or volatile constituents, and provides a crude copper, rich in impurities, and which unduly adds to the burden of the subsequent electrolytic system. A study of the latter revealed that this subsequent electro-refining had to be materially altered to make a success of the process, as other-

wise unexpected resistance arose, and interfered with the free passage of the current. Under more auspicious conditions, the same impurities can be more or less completely eliminated during blowing.

Regarding the remainder of this process, the dust from the baghouse, where the zinc contents are low, appears to have sometimes been agglomerated and directly smelted in a water-jacketed cupola to a crude solder, although the rotary smelting process has taken precedence. One report quotes that up to 7 per cent soda ash, 1½ per cent fluorspar, and 15 per cent anthracite, are included in this smelting, while the zinc is again almost completely removed in baghouses.<sup>3</sup>

#### Rotary Hearths for Zinc-Bearing Materials

For the purpose of removing zinc from accumulations of waste materials besides brasses, and also poor ores, different types of furnaces have been developed, but of recent years, the tendency appears to be towards different ramifications of the rotary kiln.

The large-scale rotary hearths complete with collecting equipment, and all accessories, as installed by Krupps, have already been described.

Another arrangement is the Waelz kiln, but which differs in that it appears to be mainly taken advantage of for dealing with oxides which have already been accumulated from previous smelting activities. The various oxides collected from working 20-ton charges in another process initially contained as much as 2.5 per cent tin, and by dint of fuming in this rotary kiln, seldom showed more than 0.5 per cent of both tin and lead contents. The design of these various rotary constructions differs from the original sloping Demag kiln more in matters of detail. The cylindrical body is rotated by gear wheels, fed by a small elevator from the hopper at one end, and is discharged at the other end, while the fume passes to the baghouse.

Improvements appear to be mainly more accurate control of the temperature and oxidation at different stages, the firing in all of them here is by means of pulverized coal, and the fume, or zinc oxide, is sold as pigment.<sup>4</sup>

This is not the only improvement possible, since although only conducted experimentally so far, efforts have been made to directly reduce zinc oxide by means of natural gas, using retorts. The retort is charged with zinc oxide calcines, and sintered concentrates, ranging from 68 to 70 per cent zinc. Using gas containing some 87 per cent methane, 8 per cent ethane, and 4 per cent propane, the reducing power appeared to be proportional to the carbon content. The other higher members of the gas were directly utilized to some 50 per cent of their reducing power. It was found that 1 lb. of zinc required 5 cu. ft. of gas, and a 95 per cent recovery of zinc appeared feasible.

Compared with current retort practice, the condensation of the zinc presented difficulties, and because of the lower concentration of zinc vapour, a greater condensing surface was apparently necessary. The economics have to be proved in actual practice, as the technical possibilities have only been demonstrated on a small scale, and retorts require to be further adapted for the purpose.<sup>5</sup>

A small type of rotary hearth has also been adapted to handle slag-matte combinations, and other slags rich in lead and antimony, besides arsenical copper drosses, copper electrolytic slimes, etc. These furnaces are lined with

alumina brick, and are diminutive in size compared with the regular large rotary hearths engaged in the modern zinc industry. Some of them are only 10 ft. in length, rotate at 1 r.p.m by means of suitable gearing, and are fired by pulverized coal in the ordinary manner. Despite the smallness in size, these units operate a waste heat boiler which cools the gases before passing to the baghouse.<sup>6</sup>

#### Specialized Firing Methods

Not a few of the earlier specialized designs of hearths and means of firing have been criticized, although researches since conducted have revealed that satisfactory results could be obtained. For example, an earlier patent covered a so-called regenerator for assisting the work of a water-gas generator, and comprised a series of serpentine chambers, filled with balls of select material. Air passes via nozzles through the ordinary shaft, filled with glowing coke, and from thence through the serpentine chambers. The globular contents were then made of a clay of only moderate heat-conducting capacity.

More recent experiments with conducting refractories used in electric furnace practice have revealed that this could make an appreciable contribution. The criticism of the original design was that this outfit worked at a disadvantage through the "perfectly needless obstruction of the gas-main by the balls being present".

By substituting better heat-conducting refractories for the balls, it was found that the temperature of the hearth could be raised to a high degree. The defect of having a restricted flow of gas was rectified by using better blowers, and also a suitable draught at the flue-end to attain experimental temperatures up to 1,600 deg. C., i.e. without the need for regenerative systems which are necessary in other arrangements.<sup>7</sup>

In an effort to forestall the difficulties with pulverized coal-firing of furnaces, a somewhat peculiar design of combustion chamber uses this fuel as the firing medium, but without the usual forced draught common to most modern designs. Only the natural draught of the smoke-stack is taken advantage of. This was apparently the subject of a considerable number of patents in earlier years, which later were modified to some degree. Feeding of the fuel depends upon a swing grating with reciprocating motion, while a crown carrying a series of vertically disposed blades, assists in distributing the fine particles. Instead of the fine mass making use of a single stream as heretofore, a number of separate channels are utilized.

Through any convenient source of power, the grating is actuated by a driving-belt from a pulley. In reviewing these various designs, despite all the research which had been devoted to them, it was ascertained that the natural draught alone could not be depended upon to systematically lift the fine particles as had been initially anticipated. Later designs showed that some form of blower had also to be included. The object of this was to forestall agglomerations due to the caking of moist particles of coal, and allow greater licence in the pulverizer unit used, and the accuracy of its performance.

As the recent tendency has been towards reverting to pulverized coal-firing in place of oil fuel, it has to be noted that the former system requires the additional cost of an efficient pulverizer, which adds very materially to the costs of conversion, and any of the foregoing efforts which endeavour to get round this might be worth perseverance.<sup>8</sup>

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## MINING MISCELLANY

A seven-man Imperial Chemical Industries delegation recently visited Russian copper and aluminium factories and has returned impressed with the speed of technical development.

The Moose Mountain Iron Mine in Northern Ontario, abandoned since 1919, is being brought back into production by the M. A. Hanna Coal Co., of Cleveland, Ohio. It is reported that the estimated value of the new mill now under construction is \$8,000,000.

A delegation of Swedish metallurgists have completed a tour of mining and processing centres in the Soviet Union. They found much to impress them and were particularly interested in new techniques for detecting mineral ores. Agreement has been reached on a constant exchange of expert groups between the two countries.

A Polish-Czechoslovak agreement on co-operation in the exploitation of the Polish sulphur deposits will shortly be concluded in Warsaw. Czechoslovak goods credits will be available to Poland to the amount of 100,000,000 roubles. These credits will be paid for by sulphur deliveries over six years, beginning in 1961, at world prices. It is anticipated that in 1961 the deposits will yield about 100,000 tons of pure sulphur.

The directors of Yuba Consolidated Gold Field have voted to merge the company and its subsidiaries into a single concern named Yuba Consolidated Industries, Inc., a Delaware corporation. Included with Yuba Consolidated in the new firm will be Yuba Industries, Inc., and Portuguese-American Tin Co. The merger will release surplus capital for the company's planned expansion into diversified manufacturing lines. Shareholders' meetings of all three firms have been called for July 26 to ratify the merger.

European and Chinese companies in Malaya have so far invested nearly \$M.10,000,000 (about £1,200,000) in mining high-grade iron ore deposits in the vicinity of Ipoh. The latest of three companies carrying out operations is the Tambun Mining Co., with a capital of \$M.2,000,000. It is a Federation company associated with Eastern Metals and Mining Co. The Tambun mine has already produced more than 50,000 tons of high-grade ore containing 60-70 per cent iron. The first shipments went to Formosa.

Statistics of Mexico's mine production in 1956, showing an overall increase in volume of 7.2 per cent over the previous year, have been published by *National Financiera*. Copper production at 83,852 tonnes increased by 53.4 per cent, sulphur (746,357 tonnes) by 44 per cent, selenium (90 tonnes) by 50 per cent, and antimony (4,556 tonnes) by 19.3 per cent. On the other hand, lead (199,610 tonnes) and zinc (248,887 tonnes) decreased by 5.3 and 7.6 respectively, mercury (673 tonnes) by 34.7 per cent, gold (10,893 kilos) by 8.5 per cent, and silver (1,340 tonnes) by 10.2 per cent.

The South Australian Government has decided to intensify the search for new mineral deposits, following encouraging reports on test drilling in the Middleback Ranges and Iron Knob areas of Eyre Peninsula. The Premier, Sir Thomas Playford, said that the first assays of ore from an area south of Iron Knob contained 50 per cent of iron and 8 per cent manganese. A further £A27,000 would be spent on the test drilling programme, which so far has cost £A56,000.

About £10,000 worth of special equipment has been made available by the U.K. Atomic Energy Authority on indefinite loan to the geological survey departments of the three territories of the Rhodesian Federation to plot radioactive mineral wealth. It includes three specially-equipped Land Rovers, one for each territory, which are fitted to record radio-activity within a range of about 50 ft. on either side while the vehicle is being driven.

A mineral map of the Central African Federation is to be produced and a draft should be ready before the end of this year. This was decided at a conference of the heads of the three territorial departments of the Geological Survey and some officials in Zomba. Southern Rhodesia already has its own mineral map, Northern Rhodesia is about to print one, and Nyasaland is busy preparing one. Once the two northern territories have completed their maps, a mineral map for the whole Federation will be prepared.

Legislation has been introduced in Newfoundland to permit formation of a new iron mining company to operate south of the Knob Lake mines, from which Quebec-Labrador ore is now being shipped to Seven Islands. A combination of Canadian and U.S. ore and steel companies proposes to form the Wabush Iron Co. to exploit deposits held by Canadian Javelin. It includes Steel Co. of Canada; Pickands, Mather and Co., Cleveland; Youngstown Sheet and Tube Co.; and Bethlehem Steel.

Local and U.S. companies are reported to be combining this year for mineral explorations in the Republic of Panama, with emphasis on manganese and bauxite. The Rosario Exploration Co. will exploit manganese deposits in the Rio Boqueron area of Colon Province, while two subsidiaries of U.S. aluminium companies have filed four-year mining rights for bauxite in the provinces of Colon, Veraguas and Chiriqui. Owners of a mining concession on copper deposits near Tole have reported that a U.S. firm will send geologists to study the lode.

### PERSONAL

Mr. James Bowman, chairman of the National Coal Board, was awarded the K.B.E. in the Honours List.

Mr. Walter Vivian Douglas Skrine has been appointed a director of Sungai Way Dredging, Ltd.

**Merton Mark V Overloaders** now working in Southern Spain are proving their worth releasing hand labour for more useful purposes. Saving in labour of 11 men loading crushed pyrites and 17 men in a limestone quarry near Huelva are instanced. After allowing for machine operating costs and depreciation, this represents a saving of over £1,750 per year per Overloader installed. The photograph shows one of the Merton Overloaders filling railway wagons with pyrites at Las Mallas





The Brayloader 30, a heavy-duty front-end loading shovel, is here shown employing a stone fork in lieu of the standard 1 cu. yd. bucket. The design of this stone fork originated with the German agents of W. E. Bray and Co. Ltd., but the tool is now being used extensively in quarry work in the U.K.

Mr. V. A. Werner has been appointed a joint managing director of Mocatta and Goldsmid.

\*

Mr. John William Dykes has resigned from the boards of Kinta Tin Mines, Ltd., Tanjong Tin Dredging, Ltd., Pusing Rubber and Tin, Ltd., and the Narborough (F.M.S.) Rubber Estate, Ltd.

\*

Mr. Felix E. Wormser has resigned his position as Assistant Secretary of the Interior for Mineral Resources, U.S. Government.

\*

Mr. O. G. Voss, managing director of International Harvester in Great Britain, left London Airport recently for Canada and the U.S. His dual mission is to promote export sales of I.H. British products and to finalise plans for the manufacture of new and additional I.H. products in Britain.

\*

Mr. B. A. Miller, of Broad Street House, London, E.C.2, is paying a short visit to Tanganyika to assist in the management at Williamson Diamond Mines.

\*

Mr. S. J. Wrigglesworth, a director of Oldham and Son, Ltd., and for many years general manager of the company, has received the O.B.E.

\*

The death has occurred of Mr. Harry Holt, Senior, who was for many years intimately concerned with the development of Oldham and Son, Ltd.

\*

Mr. Frederick Ellis, a director of British Ropes for 17 years, has died at the age of 76.

#### COMPANY EVENTS

To meet the demand for a comprehensive co-ordinated technical service to industry, able to advise on the diverse aspects of factory services, Weatherfoil, Ltd., 185 Bath Road, Slough, Bucks., have created an air treatment division, which will work closely with their existing heating and industrial divisions. A new office building is in course of con-

struction to house the unified project and will be ready for operation early in September.

\*

The name of the Automatic Coil Winder and Electrical Equipment Co., Ltd., has been changed to Avo, Ltd.

\*

The Dohm Group has opened sales offices in Basle, Vienna, Milan and Frankfort, and will do so in another German city yet to be chosen. The company is willing to act for other firms. Emphasis will be on the handling of raw materials for heavy industry.

\*

John Laing and Son, Ltd., and the H. K. Ferguson Co., of Great Britain, Ltd., are forming a separate association in the name of Laing-Ferguson to provide a complete and comprehensive construction service to the chemical, processing and manufacturing industries.

\*

The inaugural board meeting of a new company, Climax-France Ltd., was held on May 23 at Courbevoie (Seine), near Paris. As a branch of the Climax Rock Drill and Engineering Works Ltd., it represents a new member of the Holman organization. The company will be the selling and servicing organization for Maxam equipment, which is now to be made in France. It comprises pneumatic valves, cylinders and connectors, which are increasingly being used in automatic control systems.

\*

A new David Brown branch depot has been established at Salisbury, Southern Rhodesia. This depot will serve a dual purpose in that it covers the products of two separate companies in South Africa, namely David Brown Precision Equipment (Pty.) Ltd., of Benoni, Transvaal, and David Brown Tractors S.A. (Pty.), Ltd., of East London.

\*

The postal address of the Transformer Department of Metropolitan-Vickers Electrical Co., Ltd., is now Southmoor Road, Wythenshawe, Manchester, 23. For cables and telexes the department will continue to use the Trafford Park address, Metrovick Manchester Telex 66.314.

#### AGENCIES

Durham Raw Materials, Ltd., 1-4 Great Tower Street, London, E.C.3, have been appointed (as from June 1) sole selling agents in the U.K. for the products of Goodrich-Gulf Chemicals, Inc. This change is by mutual agreement between the producers and the existing agents, British Geon, Ltd. The Goodrich-Gulf Co. is the largest U.S. producer of GR-S (general purpose synthetic rubber) and supplies all the normal varieties, including the latest oil extended grades, under the grade name Ameripol. Plans are far advanced for preliminary production of Ameripol SN, which is a new synthetic material of exactly the same chemical constitution as natural rubber.

\*

Wm. C. Scott Engineering Pty. Ltd., 15 Belmore St., Burwood, Sydney, are looking for agencies for crushers, screening and ancillary equipment, vibratory feeders and magnetic separators. They are prepared to represent U.K. firms on a commission agency basis or to manufacture under licence. The firm covers only New South Wales but intends to appoint sub-agents and/or establish branch offices in other States. Manufacturers interested should write direct to the Sydney firm, notifying the U.K. Trade Commissioner, Prudential Building, 39-49 Martin Place, Sydney, that they have done so. B.O.T. ref.: E.S.B. 12989/57. Telephone enquiries to Chancery 4411, extension 776 or 866.

#### CONTRACTS AND TENDERS

The following procurement has been authorised for Somalia by the International Co-operation Administration (I.C.A.): PIO/C 49-19-007-6-70001 for a total value of \$U.S.286,000, of which \$70,680 is for construction, mining and conveying equipment (Code 740). Purchases will be carried out through the Italian Technical Delegation, 2401 Fifteenth Street, N.W., Washington, 9, D.C. The contract period is from 21/5/57 to 31/3/58 and the closing date 30/6/58. B.O.T. Ref.: ESB/14484/57/ICA. Telephone enquiries to Chancery 4411, extension 360.

\*

An order has been received by the Cambridge firm of Martin, Black and Co. (Wire Ropes), Ltd., for the supply of steel wire ropes for the friction skip winding installation at a recently developed mine operated by a large iron ore producer in the Province of Ontario. The requirement is for 21,000 ft. of 1½ in. dia. wire ropes weighing 45 tons and is valued at \$35,000. Mr. A. D. Martin, joint managing director, and Mr. G. A. Black, the export director, have just returned from a three-week visit to North America, which included a survey of the subsidiary concern, Martin Black Wire Ropes (Canada), Ltd., at Montreal and Toronto. They also had discussions with the company's customers in the U.S.

\*

The C-O-Two Fire Equipment Co. of Canada, Ltd.—newly acquired by the Pyrene Co., Ltd.—has just received a large contract for fire protection equipment for the hydro-electric power station now being built in connection with the new St. Lawrence Seaway project; this is the second largest C.O.2 fire-extinguishing contract in the Group's history.

## Machinery and Equipment

### Rotary Vacuum Filters

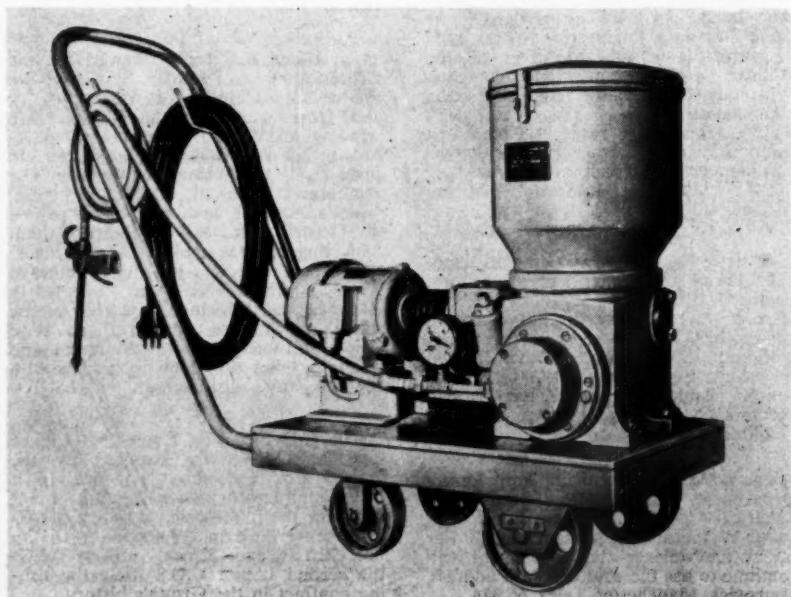
Stockdale Engineering Ltd. are now building FEinc Horizontal Rotary Vacuum Filters under licence from Filtration Engineers, Inc., United States. The Stockdale organisation is well known for the manufacture of Rotary Drum Filters, and this addition to their range will enable them to include a much larger field in their activities.

One of the main features of a table filter is that it is ideal for easy filtering materials where ample washing is required. The filters are manufactured in a standard range of sizes from 3 ft. to 12 ft. dia., but special sizes can be made to specification. In addition, modifications can be made to make the filter suitable for any particular application, as the basic design is adaptable.

Those sizes from 3 ft. to 8 ft. are fitted with a centrally-mounted variable speed drive which is installed in the base of the frame. This is particularly useful in that it eliminates the necessity and cost of separate foundations, and the filter can be moved easily if desired. The larger sizes use a conventional spur gear with roller chain drive which, however, has a ball-type main bearing with a replaceable hardened race.

The FEinc Filter has the advantages of high dewatering capacity, large cake capacity and good cake washing which makes it particularly suitable for the continuous filtration of free-settling and free-filtering materials such as coarse crystalline substances and fibrous pulps. Among the numerous operating advantages is the fact that all the filtering and washing operations are visible and, therefore, easily controlled. There is a high hourly output per sq. ft. surface, and cake thicknesses up to 4 in., or even more in special cases, can be readily handled.

**The latest addition to the range of Centralalube lubrication equipment is the Multigreasor Model FAE, generally used as a portable high-pressure pump**



### FRONT-END LOADERS

The Thew Shovel Co. is to manufacture a complete line of rubber-tyre front-end loaders in addition to its present line of power shovels and cranes. These loaders will be identified and marketed as Moto-Loaders.

Before the end of June, Thew will start production, in limited quantities, on the 1½ cu. yd. model. A ½ yd. model is now available. Engineering progress is well advanced towards the development of additional models.

Moto-Loaders by Thew, incorporate the latest developments of rubber-tyre front-end loader equipment including 4-wheel drive, planetary axles, power shift transmission, torque convertor, simplified controls, safety arms and accessory equipment for greater job application.

### LATEST RESPIRATOR HAS NEW FEATURES

Now available in Great Britain for the first time is the latest dust respirator—the Dustfoe 66—being manufactured by Mine Safety Appliances Ltd.

The M.S.A. company have considerable experience in the manufacture of dust respirators and this latest model incorporates lessons learned over a long period. One of the main features of the Dustfoe 66 is a new facepiece cushion which is contoured to provide a better, more automatic fit, giving greater wearing comfort. The cushion is made of neoprene sponge which has excellent long-wearing qualities and does not harden during use. More sponge stock has been added and this ensures that the cushion



**The FEinc Horizontal Rotary Vacuum Filter**

provides an air-tight seal on the majority of facial types without adjustment.

If any slight adjustment is required the aluminium facepiece is sufficiently pliable to be moulded into shape.

The Dustfoe 66 has newly-designed exhalation valves which are larger than on previous models. Breathing resistance has been reduced to a minimum by the new valves, which are held in position by spring-loaded rivets to obviate accidental removal.

Static-web, preformed filters are fitted and these are treated with an electrostatically-charged resin. This charge greatly improves the filtering efficiency and supplements the mechanical action of the filter fibres. No pre-filters are required. The filter-holder is of new narrow design which increases downward vision, minimizing the "blind spot" found on most respirators.

Being shorter, the filter-holder enables the wearer to bend his head forward without interference.

Another important feature of the new respirator is counter-gravity airflow. Incoming air travels upwards and this reduces the quantity of heavier particles striking the filter. Simple construction ensures that filter changing and cleaning can be carried out quickly and easily. The complete Dustfoe 66, including the headband, weighs only 3 oz.

### PORTABLE HIGH-PRESSURE PUMP

The latest addition to the range of equipment manufactured by Centralalube Ltd. is the Centralalube Multigreasor, Model FAE, generally used as a portable high-pressure pump. The unit consists of Centralalube Multigreasor, Model FAE, driven generally by an electric motor or by a petrol or diesel engine. The driving and pumping elements are mounted on a portable and easily movable trolley.

The unit is intended for the quick and efficient lubrication of a large number of grease nipples which are either stationary or moving. Connected to the pump is a flexible high-pressure pipe, at the end of which is a grease gun.

The Multigreasor was designed originally for use with conveyors. A flameproof motor can be supplied for refineries and other plant handling explosive materials.

**Metals and Minerals**

## Gleanings from the Reactive Metals Conference

A clearer picture of the potentialities, limitations and future prospects of a number of the newer metals has emerged from the very important Reactive Metals Conference, which took place at Los Angeles at the end of May.

The alkali metals and lithium were the subject of an address by Marshall Sittig, of the American Lithium Institute, who forecast that American industry would consume over 500 s.tons of lithium metal annually by 1970. Lithium, he stated, is the most rapidly growing member of the alkali family, which also includes sodium, potassium, rubidium and caesium. It is currently being used as a scavenger of gases in alloys and pharmaceutical manufacture, as a catalyst in the manufacture of synthetic natural rubber, and in the production of various lithium chemicals, which in turn find use in such fields as catalysis and organic chemistry, and in the preparation of the new chemical fuels for the supersonic bombers and missiles of tomorrow.

The alkali metals as a group have a promising future. Mr. Sittig predicted that these reactive elements—especially lithium and sodium—would find large markets in the synthesis of new metal organics, whether polymers, anti-knocks, or high-energy fuels. Sodium, which is at present used in quantities exceeding 125,000 s.tons, will prove useful in the production of such reactive metals as zirconium, titanium and beryllium. Due to its low density, lithium is exceptionally promising as a coolant for aircraft nuclear propulsion plants. It also seems to have a promising future as a stereospecific catalyst for plastic and elastomer manufacture, while both metals will find increased application in organic synthesis. The opportunities for fruitful research on the alkali metals are regarded as virtually unlimited.

★

The metallurgy of vanadium was discussed by Mr. Rostoker, of Armour Research, who expressed the opinion that, in the present state of knowledge, this metal offered more potentialities for investment casting than titanium, zirconium or molybdenum. Vanadium is very resistant to aerated salt water attack, being better than most stainless steels. Against dilute HCl and H<sub>2</sub>SO<sub>4</sub>, it is probably as good as any metal. It also has good resistance against liquid metal attack in a number of cited interests. Vanadium cannot, however, withstand nitric acid, whether dilute or concentrated.

At present there are at least three possible applications for vanadium alloys:

1. Weldable, formable, high hot strength sheet alloy for airframe service at temperatures up to 1,200 deg. F.

2. Fuel element cladding for fast reactors, where interdiffusion, hot strength and thermal conductivity are considerations.

3. As a diffusion barrier between titanium and steel in the manufacture of clads between these two metals.

The rôle of thorium was reviewed by C. C. Woolsey, of North American Aviation, who stressed the thermal stability of this atomic fuel. The thorium-uranium-235 fuel cycle provides the highest neutron production ratio and hence is the system most likely to allow breeding in a thermal reactor. There are few data on the behaviour of thorium under reactor operating conditions, but the basic properties of the metal, its alloys and its oxide lead to the belief that satisfactory fuel behaviour can be expected. It might be expected that the inventory of thorium in nuclear reactors would be 11,000 tons in 1975, with a replacement rate of two to four tons per year.

Some economic aspects of the rare earths were discussed by Walter Bilicke, president of Engineers Syndicate, Ltd. He stated that monazite, the thorium phosphate of the cerium group of rare earths, could be an important by-product, or in some cases, the principal economic mineral in alluvial deposits. At the present time, due to over-production of the cerium group, only monazite of high thorium was readily marketable at a price conducive to profitable operations. The world shortage of the cerium group was rapidly overcome by an increase in the price for monazite. In general, other minerals than monazite must be amenable to upgrading to a minimum of 10 per cent thorium content and must be further amenable to refining to be of economic interest.

Some observations regarding the rare earth metals were also made by Mr. James Boyd, vice-president of Kennecott. Experimentation and uses of these elements, he stated, had been inhibited in the past because of the complex chemistry and the extreme difficulty encountered in making separations of one element from another or extracting a pure constituent. Today, new ion exchange techniques are changing and improving our methods of extraction and separation.

As might perhaps have been anticipated, these elements have suddenly become of importance in the reactor field. Cerium oxide of high purity permits the production of a safe glass through which scientists and technologists can view reactions within the atomic pile. Other extensive uses of rare earth metals appear to be indicated in reactor applications. We have still to learn their potential.

★

Mr. Boyd also touched upon molybdenum. Pointing out that the current supply is small, he said that if this metal were required on a large scale, "we should have to scramble for new sources." If copper production is to be further curtailed, this might tend to increase the shortage of molybdenum, which is often involved in operations of the copper mining companies.

### THE PLATINUM MARKETS

Although leading refiners still maintain their officially published quotation of

\$92-\$95 an oz., outside dealers have been offering platinum on the New York market as low as \$89 in fair quantity. Industrial consumption remains below last year's rate, but is still relatively high and is heavy enough to preclude building up on users' inventories. New York mercantile exchange futures market remains tradeless, without bids or offerings.

The general pattern of the U.K. free platinum market has undergone no material change; generally speaking, the volume of fresh trading interest is very light. Dealers' price ideas now range from £32 to £32 10s. per troy oz. A price of £34 continues to be quoted by the two leading U.K. refiners to their regular customers. The Soviet Union is said to be selling fairly regularly, but is not pressing offers.

### INDIA'S MANGANESE TRADE

A total of 1,395,000 tons of manganese ore was exported from India in 1956. This quantity has only been exceeded at the time of the Korea boom.

In the first quarter of 1957 India produced 430,000 tons of manganese ore. This was 69,000 tons lower than output during the corresponding quarter of 1956, but represented an advance from the fourth quarter's production.

The State Trading Corporation is aware that the export trade in manganese is showing signs of a setback, reports our Correspondent in the Far East, but seems to feel that the Corporation has been a victim of unfavourable propaganda. Foreign buyers, it is reported, have been trying to hold off purchases because of the higher prices of Indian manganese, and speak of alternative sources of supply. Nevertheless, the Corporation is hopeful that it will maintain the export price of the ore. In order to present an organised trade front, it has circularised manganese exporters requesting the submission of trade data.

The Madhya Pradesh Mineral Industry Association has demanded that the government should announce a long-term policy regarding the export of manganese ore, so that its mining and sales can be planned.

★

Inter-American Industries, Inc., has installed and is now operating in Oriente Province, Cuba, the first heavy medium separation plant to be built in that country for the concentration of high-grade manganese ores. It is expected that production will be increased to a monthly rate of 1,000 tons of concentrates within the next six months.

### RHODESIA RAILWAYS' RECORD

Traffic carried by the Rhodesia Railways during the year ended March 31 rose by 11 per cent in comparison with the previous year to the record total of 10,800,000 tons. For the first time since the war the Railways came near to meet-

ing the public demand. The amount of coal and coke at Wankie went up by 9.7 per cent to 3,600,000 tons, while 102,000 tons were carried from other collieries. Apart from coal 2,600,000 tons of minerals were carried—an increase of 10.4 per cent. The records for chrome, copper, zinc, lithium, asbestos and limestone were all broken. In the case of chrome ore, exports increased by 45 per cent to 713,000 tons.

#### TANTALUM AND COLUMBIUM

Problems involved in the production of tantalum and columbium metals have been discussed in Washington at a meeting of the recently created Tantalum and Columbium Metal Producers Industry Advisory Committee with officials of the Business and Defence Services Administration and other Government agencies.

Production capacity is increasing and, according to some committee members, will be sufficient to meet any foreseeable military requirements. The committee was unable, however, to assess government requirements for tantalum or columbium at any future date.

Committee members said that there now existed a substantial surplus of columbium metal capacity in the U.S., and some declared that their companies were unable to find purchasers for all their tantalum powder. On the other hand, it was reported that capacitor manufacturers had been asking for directives from B.D.S.A. to assure delivery of tantalum strip and foil needed to fulfil

defence orders. A study of capacitor production capacity completed by the Department of Defence indicates that requirements for these capacitors will almost double each year for several years.

The producers were in general agreement that the present columbium-tantalum ore supply available to the U.S. was ample, but that prices were an important factor in its acquisition. Several producing companies are spending substantial sums on the development of new uses, including a potential use in turbines.

#### URANIUM FROM LIGNITE

Mr. Jesse Larson, Director of the Raw Materials Division of the U.S. Atomic Energy Commission, has stated that a successful process for separating uranium from lignite can be expected within the next year. Deposits in the Dakotas and some in neighbouring states have been estimated to contain from 500,000 to 700,000 tons of lignite. There is every indication that this year the process will be refined to a point where the uranium separated can be produced at approximately the same cost as that of mining uranium in the Colorado Plateau.

#### LITHIUM INSTITUTE MOVES

The American Lithium Institute, Inc., has moved to new and larger quarters on the fourth floor of 32 Nassau Street, Princeton, N.J. Its postal address is P.O. Box 549, Princeton, N.J.

#### COPPER • TIN • LEAD • ZINC

*(From Our London Metal Exchange Correspondent)*

The week has been overshadowed by the decline in the copper market, which was sparked off by the reduction in the price of U.M.H.K. copper from 29.40 c. per lb. basis New York to 28.95 c. per lb. basis New York. On Friday, the London market was particularly weak on expectations, which were subsequently realised on Monday, of a reduction in the R.S.T. price from £240 to £230 per ton. Lack of new demand and lower quotations in the States for export copper at 28½ c. and for No. 2 scrap at 23½ c. caused a further decline on Tuesday, but a steadier undertone then developed, which was, however, arrested by the unexpectedly large cut in the U.S. domestic producers' price on Wednesday. This price now stands at 29½ c.—a reduction of 2½ c.

The purely domestic figures for the U.K. showed a slight fall in the off-take of copper in all forms from 53,482 long tons in March to 51,868 in April; the stocks increased from 61,779 to 71,101 tons. Stocks in official warehouses as reported on Monday showed a further increase of 146 tons at 9,893 tons.

Tin has been featureless, although the undertone is again firm in the face of transport difficulties in Malaya and the possibility of a strike in Bolivia on July 1.

Lead and zinc have both been uninteresting markets with quotations falling away (U.S. zinc is now being quoted at 10½ c. East St. Lawrence). This decline is more in sympathy with the copper market than for any other reason, although the fundamental position of over-supply

still exists and with the holiday season approaching, it will be surprising if a further reduction in all-round quotations can be avoided.

#### U.S. COPPER PRICE CUTS

During the week there have been announcements of further cut-backs of production of copper in America, but even so it had been becoming apparent that something drastic would have to be done by the big groups if the present state of over-production was to be rectified, as the world has now entered one of those periods when new production planned years back is coming into effect, while the rate of increase in consumption is still affected by the lack of metal last year. The majority of people, however, consider that consumption will now increase more rapidly than production and that any cuts made now will only be of limited duration. Whether the producers are able to stockpile enough of their own output to balance the supply and demand equation is the big question to be answered before any realistic assessment can be made of the possible price trends in the next three months.

The sharpness of the price cuts announced by the American producers this week suggests that a serious attempt is being made at achieving some uniformity in world prices as a basis on which to make a real stand against further price cuts. At the moment the Canadian producers and the R.S.T. group are both

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quoting over 1 c. below the new American price, and it remains to be seen whether the effect of the latest American cuts will be to force these prices lower or to facilitate the establishment of a more or less uniform quotation which will tide the producers over the slack holiday period.

The most interesting facts to emerge from the figures produced by the Copper Institute for May and by the British Bureau of Non-Ferrous Metals Statistics for April are that the world production of refined copper reached a new peak at 275,328 short tons, but that the increase outside the United States was the higher. This same trend was shown in mine production, as here a decrease in the U.S. was more than made up by an increase outside; deliveries of refined copper to U.S. industry were the highest since June of last year at 120,351 short tons, whilst deliveries outside the States remain unchanged; alterations in the rates of refined copper, however, resulted in a slight reduction in total stocks held outside the States, whereas in the States the stocks of copper held by producers rose substantially to 155,365 short tons, being the largest excess for many years.

#### SOME CURRENT STATISTICS

During the week the International Tin Council issued its world tin statistics, which showed that mine production of tin-in-concentrates rose from 12,300 long tons in February to 13,800 tons in March. This gives a production for the first quarter of 1957 of 40,600 tons, which is approximately the same as the first quarter of 1956. Indications are that production for April will be somewhat less than for March. Figures for the production of tin metal for March are not yet available, but preliminary returns show that there was a substantial recovery from February and that the first quarter total is likely to be only very little below the quarterly average for 1956.

Turning to the consumption side, 13,500 tons were consumed in the world during February against 14,100 tons in January. Tin-plate production during March rose from about 643,000 tons in February to 888,000 tons in March, with production in the U.S. being a record. In London, stocks in official warehouses fell slightly by 57 tons to a total of 1,961 tons. The latest U.K. statistics for tin showed that April consumption was 1,752 tons against 1,878 in March and that stocks of refined tin at the end of April totalled 3,281 against 3,450 tons at the end of March. On Thursday morning the Eastern price was equivalent to £779 per ton c.i.f. Europe.

\*  
The only statistics covering lead and zinc which have been published refer to the United Kingdom only and the most interesting show that in April only slightly less lead was used than in March: 27,246 tons against 29,441 tons, the cable and battery trades using slightly less, but the sheet and pipe trade using more. Stocks of refined lead at the end of April totalled 44,933 tons against 34,877 tons in March.

For zinc the off-take in April was lower than in March: 24,247 tons against 27,309 tons, all the main trades recording declines. Stocks at the end of April totalled 37,540 against 41,260 a month earlier.

Closing prices and turnovers are given in the table on page 795.

## LONDON METAL AND ORE PRICES, JUNE 20, 1957

## THE WEEK ON THE L.M.E.

	June 13		June 20	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£232½	£232½	£220½	£221
Three months	£234½	£234½	£222½	£222½
Settlement	£232½		£221	
Week's turnover	4,050 tons		8,725 tons	
LEAD				
Current ½ month	£92	£92½	£90	£90½
Three months	£92	£92½	£90½	£90½
Settlement	£765		£761	
Week's turnover	3,100 tons		4,750 tons	
TIN				
Cash	£764	£765	£760½	£761
Three months	£761	£761½	£758½	£759
Settlement	£765		£761	
Week's turnover	695 tons		700 tons	
ZINC				
Current ½ month	£74	£74½	£72½	£72½
Three months	£74	£74½	£72½	£72½
Week's turnover	4,775 tons		4,875 tons	

## METAL PRICES

Aluminium, 99.5%. £197 per ton

## Antimony

English (99%) delivered, 10 cwt. and over £210 per ton  
Crude (70%) £200 per ton  
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton

Bismuth (min. 1 ton lots) 16s. lb. nom.

Cadmium 12s. 0d. lb.

Cerium (99% nett), £13 18s. lb. delivered U.K.

Chromium, Cr. 99% 7s. 2d. lb.

Cobalt, 16s.-19s. lb.

	ORES AND OXIDES				
Bismuth	...	...	...	...	30% 5s. 0d. lb. c.i.f. 18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—					
Rhodesian Metallurgical (semifriable) 48%	...	...	...	...	£17 8s. 0d. per ton c.i.f.
" Hard Lumpy (45%)	...	...	...	...	£17 8s. 0d. per ton c.i.f.
" Refractory 40%	...	...	...	...	£12 15s. 0d. per ton c.i.f.
" Smalls 42%	...	...	...	...	£16 5s. 0d. per ton c.i.f.
Baluchistan 48%	...	...	...	...	£12 0s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	...	...	...	...	185s./197s. 6d. per unit
Fluorspar—					
Acid Grade, Flotated Material	...	...	...	...	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% Ca F <sub>3</sub> )	...	...	...	...	15s. 0d. ex. works
Lithium Ore—					
Petalite min. 3½% Li <sub>2</sub> O	...	...	...	...	£8-£10 per ton f.o.b. Beira
Lepidolite min. 3½% Li <sub>2</sub> O	...	...	...	...	£8-£10 per ton f.o.b. Beira
Amblygonite basis 7% Li <sub>2</sub> O	...	...	...	...	£28-£32 per ton f.o.b. Beira
Magnesite, ground calcined	...	...	...	...	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	...	...	...	...	£21 0s./£22 0s. d/d
Molybdenite (85% basis)	...	...	...	...	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore—					
Rutile 95/97% TiO <sub>2</sub> (prompt delivery)	...	...	...	...	£57-£59 per ton c.i.f. Aust'n
Ilmenite 52½% TiO <sub>2</sub>	...	...	...	...	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	...	...	...	...	137s. 6d./142s. 6d. per unit c.i.f.
Manganese Ore Indian	...	...	...	...	131d./133d. per unit c.i.f.
Manganese Ore (46%-48%) basis 130s. freight plus 5% surcharge	...	...	...	...	106d./108d. per unit c.i.f.
Manganese Ore (43½%-45%)	...	...	...	...	100d./102d. per unit (including duty)
Manganese Ore (38%-40%)	...	...	...	...	
Vanadium—					
Fused oxide 90-95% V <sub>2</sub> O <sub>5</sub>	...	...	...	...	£12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO <sub>2</sub> )	...	...	...	...	£19 per ton c.i.f.
Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram	...	...	...	...	
Gold, 250s. 7d.	...	...	...	...	
Iridium, £27/29 oz. nom.	...	...	...	...	
Lanthanum (98/99%) 15s. per gram	...	...	...	...	
Manganese Metal (96%-98%) £310	...	...	...	...	
Magnesium, 2s. 5½d. lb.	...	...	...	...	
Nickel, 99.5% (home trade) £600 per ton	...	...	...	...	
Osmium, £20/22 oz. nom.	...	...	...	...	
Osmiridium, nom.	...	...	...	...	
Palladium, £8 0s./£8 10s. oz.	...	...	...	...	
Platinum U.K. and Empire Refined £32/£32½ oz.	...	...	...	...	
Imported £32/£32½ nom.	...	...	...	...	
Quicksilver, £91 10s. ex-warehouse	...	...	...	...	
Rhodium, £42 oz.	...	...	...	...	
Ruthenium, £15/£17 oz. nom.	...	...	...	...	
Selenium, 75s. nom. per lb.	...	...	...	...	
Silver, 78½d. f. oz. spot and 78d. f.d.	...	...	...	...	
Tellurium, 15s./16s. lb.	...	...	...	...	

## LONDON STOCK EXCHANGE PRICES, JUNE 19, 1957

Price June 19	+ or -	Price June 19	+ or -	Price June 19	+ or -	Price June 19	+ or -
on week		on week		on week		on week	
<b>Finance</b>							
African & European	55/74		Rand Gold contd.	31/6XD	-1/-	Tin (Nigerian and Miscellaneous) contd.	
Anglo American Corp.	123/9	-3/9	W. Rand Consolidated	27/4½ X D	-10½d	Gold & Base Metal	1/6
Anglo-French	23/6	-6d	Western Reefs	27/4½ X D	-10½d	Jantar Nigeria	3/3
Anglo-Transvaal Cons.	27/6XD	-1/3	O.F.S. Gold	5/3	Jos Tin Area	15/3	
Central Mining (£1 shrs)	63/9	-1/3	Freddies	3/10½	Kaduna Prospectors	2/-	
Consolidated Fields	50/7½	-3/7½	Freddies Consolidated	72/-	Kaduna Syndicate	2/6	
Consol. Mines Selection	31/3	-2/6	F.G. Geduld	72/-	London Tin	10/10½	
East Rand Consols.	1/6XD	-4½d	Geoffries	3/1½	United Tin	9/1d	
H. E. Prop.	58/9	-9d	Harmony	23/-			
Johnnies	7/7½XD	-9d	Lorraine	4/4½	Silver, Lead, Zinc		
Rand Mines	67/6XD	-2/6	Lyndburg Estates	13/6	Broken Hill South	7/1/3	
Rand Selection	35/5XD	-1/3	Mieriespruit	3/10½	Burma Mines	3/3	
Union Corporation	39/1½	+1½d	Middle Wits	9/9	Consol. Zinc	7/1/6	
Vereeniging Estates	93/1½ X D	-7½d	Ofis	52/3	Lake George	7/6	
Writs	37/6XD	-1/3	President Brand	50/6	Mount Isa	27/6	
West Wits.	34/½XD	+1/3	President Steyn	26/9	New Broken Hill	44/4½	
<b>Rand Gold</b>			St. Helena	27/7½	North Broken Hill	102/6	
Blyvoors	20/3XD	-9d	Virginia Ord.	9/9	Rhodesian Broken Hill	9/10½	
Brakpan	4/6½XD	-3½d	Welkom	15/6	San Francisco Mines	26/-	
Buffelsfontein	33/6	+1/6	Western Holdings	66/10½	Uruwira	2/10½	
City Deep	11/10½ X D	-1/3	<b>West African Gold</b>	1/½			
Consol. Main Reef	11/3½XD	-1/10½	Amalgamated Banket	4/1½	<b>Miscellaneous Base Metals and Coal</b>		
Crown	19/3½XD	-2/2½	Ariston	20/-	Amal. Collieries of S.A.	2½XD	
Daggas	30/9½XD	-1/5	Ashanti	2/7½	Associated Manganese	39/6XD	
Dominion Reefs	15/3½XD	-1/3	Bremang	1/3	Cape Asbestos	11/6	
Doornfontein	21/3½XD	-1/3	Ghana M.R.	1/7½	C.P. Manganese	22/4½	
Durban Deep	21/9½XD	-1/3	Konongo	1/4½	Consol. Murchison	47/6XD	
E. Champs	2/4½XD	-4½d	Marlu	1/4d	International Nickel	20½	
E. Daggas	7/6XD	-9d	Taquah	6d	Mining Corp. of Canada	27½	
E. Geduld (4s. units)	27/½XD	-1/1	Western Selection	5/1½	Noranda	5102	
E. Rand Props.	36/10½ X D	-10½d			Quebec	25½	
Geduld.	66/3XD	-3/5			Wankie	18/-	
Govt. Areas	3/3	-1½d			Witbank Colliery	5½	
Hartebeestfontein	14/9½XD	-1/3	<b>Australian Gold</b>	12/10½			
Liбанон	6½-XD	-3½d	Great Boulder Prop.	13/1½	<b>Canadian Mines</b>		
Luipaards Vlei	12/9½XD	-10½d	Lake View & Star	19/4½	Dome	\$26½	
Marievale	17/1½ X D	-1/1	Mount Morgan	13/½	Hollinger	\$68½	
New Kleinfontein	3/3	-1½d			Hudson Bay Mining	\$137	
New Pioneer	21/10½	+1½d	Sons of Gwalia	7/-	International Nickel	\$209½	
Randfontein	30/6XD	-1/1			Mining Corp. of Canada	27½	
Robinson Deep	6/3XD	-1/1	Western Mining	9/-	Noranda	5102	
Rose Deep	8/3	-3d			Quebec	25½	
Simmer & Jack	3/7½XD	-1½d			Yukon	5/7½	
S.A. Lands	21/6XD	-1/3	<b>Miscellaneous Gold</b>	7/9 XD			
Springa	1/10½	-1½d	Cam & Motor	6d	<b>Oil</b>		
Stilfontein	28/6-XD	-1/6	Champion Reef	6d	Apex	61/3XD	
Sub Nigel	16/1½ X D	-1/6	Falcon Mines	7/10½	Attock	52/6	
Vaal Reefs	31/1-XD	-1/1	Globe & Phoenix	23/½-XD	British Petroleum	171/3	
Van Dyk	2/3/XC	-1/1	Motapa	10½d	Burmah	117/6	
Venterspoort	11/6XD	-1/1			Burma	7½d	
Vlakfontein	14/5-XD	-1/3	Mysore	3d	Canadian Eagle	87/-	
Vogelstruisbult	11/6XD	-1/6	Nundydroog	6d	Mexican Eagle	+1/3	
West Driefontein	93/9XD	-2/6	St. John d'el Rey	49/6	T.P.D.	20/3	
			Zams	50/7½-XD	Ultramar	51/7½-XD	

## Mining Finance

### Siamese Tin Looks Around

An output of 3,656 tons of tin concentrates—a record figure—compared with 2,629 tons in 1955 was the prime achievement of Siamese Tin Syndicate last year. The greatly improved results were partly due to a full year's production from the Renong and Katu dredges, but also to the sharp expansion of output from the Huey Moot property. For some time operations at Huey Moot have been poor, but in 1956 the yardage treated increased by no less than 86 per cent and recoveries by over 200 per cent. These, allied with slightly lower average working costs, are the salient points underpinning the advance in the consolidated profits for the year before tax of £770,714 compared with £491,344 in 1955. As previously mentioned in our issue of May 31, the net profit figure came out at £324,905, representing a 16 per cent increase on earnings over the preceding year, which goes a long way towards explaining the increase in the dividend distribution by 15 per cent to 60 per cent.

Mr. Robert S. G. Scott, chairman, in his detailed review of the year's operations, tells of the formation of a wholly-owned subsidiary in the Bahamas known as the Bahamas Minerals and Investment Co., Ltd., to which approximately 75 per cent of the share capital of the recently acquired Renong and Katu companies have been transferred. This will enable the build-up of a useful fund of capital out of profits of these companies for future development.

Referring to the Lowland Lead Mines, Mr. Scott speaks of frustration and disappointments in bringing the mill into operation, which have been heightened by the recent drop in the market prices of lead and zinc. Even so, and taking the worst possible view, the chairman looks forward to moderately profitable results from this interesting Scottish lead-zinc proposition.

In general, the chairman is bullish about the future outlook for tin, on which tack he is in good company. However, the company's continued lack of success in finding any substantial fresh reserves of tin in South Thailand and the Malayan Peninsula has diverted the Board's search for sources elsewhere. In this connection, a property in Western Australia is mentioned and rejected and another in Peru, of which more may be heard in the future. There is also the interesting statement that the company is participating on a small scale with the Rio Tinto Co. and Le Nickel S.A. in an extensive exploration programme over a large part of Western Queensland.

Taking into account the substantial benefits which will most likely accrue to the company under the Finance Bill, the built-in price support for tin by the potential buying power of the Buffer Stock, and the forward-looking policy pursued by the Board, it is difficult to understand why the yield on the shares should be as high as 19 per cent. This would even discount the fact that production during the first quarter of the current year has not been maintained at a

level comparable to that achieved in the same period in 1956.

#### SELECTION TRUST'S STRONG FINANCIAL POSITION

The rise by as much as 50 per cent in the gross revenue of Selection Trust during the year ended March 31 last makes cheerful reading. The expansion, however, was largely due to the higher distributions from the American Metal Co., in which the Trust holds 25 per cent of the capital and from Tsumeb Corporation in which the company has a 14½ per cent participation. Earnings are, therefore, closely geared to the prices of copper, lead and zinc, and thus the current year's results, on present showing at any rate, are unlikely to compare with those under review.

Mr. A. Chester Beatty conditions shareholders to this outlook in his statement accompanying the report and accounts when he says that: "Revenue for the current year will be lower—perhaps substantially so, but much will depend on the future course of metal prices." Notwithstanding this declaration, the strong financial position as shown in the consolidated balance sheet has enabled the chairman to say that he thinks it will be possible to maintain the rate of dividend during the current year.

Moreover, it may be noted that despite the sombre outlook in the new terms for copper, lead and zinc, the group's liquidity position is such that in spite of the acquisition of an appreciable interest in Western Decalta Petroleum earlier this year, the company is still able to entertain new mining business and to continue its search for opportunities to extend its interests into new fields.

#### THE RISE IN "JOHNNIES": IS IT THE PLATINUM?

In mining markets, which have been one way and another affected by such widely varying factors as Royal Ascot, the end of a three-week account, a fresh slashing of U.S. copper and zinc prices, and the second Test at Lord's, prices this week have not been generally following a very settled pattern. With this said, there have nevertheless been some interesting features and quite easily the most outstanding has been the sharp and sustained rise in the £1 shares of Johannesburg Consolidated Investment.

As we go to press, the shares have reached 52s. At the end of last week they stood at only 46s. and earlier this year touched a low of 37s. 9d. For a long time past, it has been possible to make out a good case for investment in "Johnnies". The company has consistently under-distributed earnings by a big margin, the payout of 17½ per cent, for instance, in 1955-56, coming out of earnings of the order of 72 per cent. At the same time, the last balance sheet showed an asset value per share far in advance of anything like a recent market price. It would

thus be plausible to think that this week's accretion of support for the shares has stemmed from investors' newly-found appreciation of the stock's inherent worth.

This explanation, however, would appear too facile bearing in mind the generally tentative behaviour of the Kaffir market. Moreover, it would have required very large buying indeed on the part of the ordinary public for the shares to have gone ahead to the extent they have.

In these circumstances, it seems reasonable to give a measure of credence to the unconfirmed reports that an important financial group has, in fact, been in the market, either directly or otherwise, with an ultimate view of obtaining a substantial slice of the control of "Johnnies". There is, of course, no confirmation of these reports, but the names of Messrs. Engelhard and Richdale are again being freely mentioned. It will be recalled that this U.S. partnership formed what was thought to be about 50 per cent of the consortium which, comprising certain banking groups and Rand finance houses, recently obtained a large measure of control of Central Mining and Investment.

It would be altogether logical for the Engelhard-Richdale set-up to want to have a big say in "Johnnies" affairs. "Johnnies", it is pertinent to remember, runs and has a large stake in Rustenburg Platinum Mines, the world's largest individual producer of platinum group metals—at any rate outside Russia and her satellites. In turn, Engelhard-Richdale control the U.S. Baker Platinum group. Under present arrangements—and these have been in operation for a long time—Rustenburg's output is largely taken by Messrs. Johnson Matthey, the U.K. refiners and distributors. There is some association and overlapping of share interests between Consolidated Gold Fields and Johnson Matthey on the one hand and Rustenburg on the other. It is believed that Baker Platinum takes its raw material—usually a high grade concentrate—mainly from International Nickel. If the same group were to obtain access to the Transvaal's raw material resources, the platinum world would find itself in an altogether different set-up.

For the share market, the matter cannot be resolved one way or another until an official statement may be made. If recent rumours prove to be true, the present price of 52s. for "Johnnies" might easily still be a deal too low. It might be irrelevant to recall that considerable buying of Central Mining shares was going on in the open market at continuously rising prices before anything was officially known of group deals in the shares.

#### RAND MINES ISSUE

Advertising again to the position of Central Mining, it is to be put on record this week that Rand Mines, the associated South African mining house, is, rather unexpectedly, to make an important new issue of shares. Subject to the passing of

the necessary resolutions, the authorized capital of Rand Mines is to be increased from £550,000 to £850,000 and if U.K. Treasury permission is obtained, it will be the intention of the directors to make an early issue of 700,000 shares. These are to be offered as to 215,099 shares to existing shareholders on a 1 for 10 basis at 6s. 6d. per share, and 484,901 shares are being offered at 6s. 6d. to the Central Mining Finance and the consortium referred in the earlier note on "Johnnies". Central Mining and Finance is the newly-formed wholly-owned subsidiary of Central Mining and Investment Corporation which took over the Corporation's assets, liabilities and operations as at March 29 last.

#### KAFFIR DIVIDENDS SUMMARISED

The Kaffir dividend season closed on Friday with the publication of the Union Corporation Group declarations. Below is a complete list of the current payments, together with the preceding three for comparison.

	<i>End</i> 1955	<i>Mid</i> 1956	<i>End</i> 1956	<i>Mid</i> 1957
Blyvoor	1/-	1/-	1/-	1/-
Brakpan	-7½	-4½	-6	-4½
City Deep	nil	nil	-6	-6
Cons. Mn. R.	2/6	2/-	1/6	1/3
Crown	3/6	3/-	2/-	1/-
Dagga	3/-	2/9	2/9	2/6
Dom. Reefs	1/3	1/3	1/3	1/3
Doornftn.	—	—	—	-6
Durban D.	1/3	1/3	1/6	1/6
E. Champ.	-4	-3	-7*	-3
E. Dagga	-10½	-9	-9	-9
E. Geduld	2/3	2/-	2/3	2/-
E. Rand Pty.	2/-	2/-	2/6	2/3
Geduld P.	8/-	6/9	7/6	6/3
Govt. Areas	-3/	-3/-	-3/-	nil
Grootvlei	1/4	1/1	1/4	1/1
Hartebeest	—	1/-	1/6	2/6
Libanon	-3½	-3½	-3½	-3½
Luipaards V.	-7½	-9	-10½	1/-
Marievale	1/3	1/-	1/3	1/-
Modder. E.	1/3	1/-	1/-	1/-
Randftn.	2/6	2/6	2/6	2/3
Rand Leases	-6	-3	-1½	-1½
Rietfontein	1/2	1/1	1/1	1/1
Robinson Dp.	1/6†	-3	-6	-6
Simmer	-5	-5	-5	-5
Springs	-5½	-2½	-3	nil
S.A. Lands	1/6	1/6	1/6	1/6
S. Roodep't.	-10½	1/1½	1/1½	1/1½
Stilfontein	-6	-6	-6	1/-
Sun Nigel	3/3	3/-	2/4½	1/9
Vaal Reefs	—	—	1/-	1/3
Venterspost	-7½	-9	-10½	-10½
Vlakfontein	-8	-9	-10	-10
Vogels	1/8	1/8	1/6	1/4
West Drie.	2/6	2/9	3/-	3/3
W. Rand Cons.	2/-	1/9	2/3	2/-
W. Reefs	1/3	1/3	1/3	1/3

\* Including 4d. bonus.

† Including 3d. additional payment.

#### BELCHER'S INTERESTING PROSPECTS

In the past year or eighteen months, U.K. investors have been increasingly aware of the importance, and sometimes the attractions, of many of the newer Canadian mining operations. These usually have been uranium operators, but iron ore has also come into the picture. Belcher Mining Corporation is among the number of companies whose shares have commanded a free market in London for a considerable time under the Rule 163 (1) (e). Belcher has been proving important and, it would appear, exceptionally large, magnetite deposits on Inne-

talling Island in the Hudson Bay. So far as ore is concerned, major exploration appears to have been already successfully completed.

The colourful annual report for 1956 has reached London this week. The proven section of the magnetite deposits, it is stated, are estimated at over one billion (presumably a North American billion) tons and would support substantially production for generations. The exploitation of the deposit would be by cheap open-pit methods. The chairman says that there would be no costly rail-haul and that Innetalling ores would be transported at low-cost direct all-water routes to the world's iron markets.

Two factors are of immediate importance in Belcher's outlook. It is first essential for the company to find markets and to obtain contracts. In this connection it has been learned that the president is this week in Europe and thought to be discussing matters with Mannesmann. Assuming the settlement of adequate contracts, the financing required to bring the mines to production would be a simple matter. There seems to be some confidence that the company will, in fact, land suitable contracts. If this proves to be so the shares at a recent London price of around 23s. might well prove too low. A speculation it may be, but for the present an interesting one.

#### FINANCIAL NEWS AND RESULTS IN BRIEF

**Capital Return by Van Dyk.**—Van Dyk Consolidated Mines propose to make a repayment of 1s. per 10s. share. It is considered that in view of the mine's limited life the present issued capital is too great.

**2s. Back From Rose Deep.**—Rose Deep's proposed repayment of 2s. per share has been confirmed by the Supreme Court. Due on July 1, the repayment will reduce Rose Deep's capital to 700,000 shares of 9s. 6d. each.

**Natal Navigation.**—There is almost no change in Natal Navigation's estimated earnings in the year to June 30, 1957—at £269,100 they compared with £263,966 in 1956. The same distribution as last year is recommended: a final of 10 per cent (making 20 per cent for the year) plus a bonus of 5 per cent.

**Clydesdale Nets More—Pays More**—Estimated net profit earned by Clydesdale (T'vaal) Collieries for the year ending June 30, 1957, is £346,600, £128,600 better than 1956. Noteholders have exercised their conversion rights, but in spite of the consequent increase in capital by 240,189 shares of 5s., the final dividend is 20 per cent, an increase of 33½ over last year's 15 per cent.

**Anglo American Collieries.**—There are no surprises in the dividend declarations by S.A. Coal Estates and Natal Coal Exploration, the two Anglo American Group collieries which end their financial year in June. From a slightly reduced profit of £303,000 (1956, £313,220) Natal pays 5d., making 9d. for the year against last year's 7½d., while S.A. Coal Estates pays 1s. 6d. per share (making 3s. 9d.) from virtually unchanged earnings of £398,00.

**Sungei Kinta Maintains Improvement.**—Sungei Kinta's results for the year ended December 31, 1956, show that the substantial improvement experienced in the previous year has been more than maintained, with net profits almost £4,000 up at £66,401. The dividend to be recommended at the A.G.M. (London, July 31) is 3s. (4s. last year). Mr. R. Ellerton Binns is chairman.

**No Idris Interim.**—Idris Tin state that no interim dividend will be paid in the current financial year. Nevertheless, shareholders have a gross total of 6s. 4½d. to come, made up of 4s. repayment of capital, 2s. cash distribution from the proceeds of the Kranji Section sale, and 4½d. final dividend. Total dividends for

the year are thus 9d., against 1s. 4½d. last year. Meeting, London, July 10. Mr. A. G. Glenister, C.B.E., is chairman.

**Fresnillo Will Pay Quarterly.**—In future, the Fresnillo Company will pay four dividends each year in place of the half-yearly declarations made hitherto. In announcing this, the President, W. Mason Smith, Jr., points out that although the present 40 c. is somewhat below recent declarations due to increased wages and reduced metal prices, this is partly offset by a reduction in Mexican taxes, which are based on metal prices. At Naica-Gibraltar, an improvement in grade is now being experienced, while at Fresnillo there has been a decline.

**Zams Rights Offer.**—The report and accounts for Zambesia Exploring Co. and its subsidiaries show continued prosperity in the year to March 31, 1957. Profit after taxation increased from £89,029 in 1956 to £108,627 this year, reserves from £605,832 to £676,079 and dividends paid from 17½ per cent to this year's total of 20 per cent. In fact, the dividend has shown an almost unbroken rise since 1953's payment of 15 per cent. A rights issue at par of 1 for 21 is proposed. The meeting will be held under the chairmanship of Capt. Rt. Hon. Charles Waterhouse, M.C., D.L., M.P., on July 10 in London.

**H.E. Proprietary Pays Same.**—At £222,118, H.E. Proprietary's profits before taxation were slightly up on the previous year's £199,038. However, the net profit brought into the company's accounts was £56,014 against £64,454. This apparent anomaly is explained by the fact that £39,046 was retained by subsidiaries this year, almost £13,000 more than in 1955. The dividend, however, is unchanged at 6d., making a total of 9d. for the year. The meeting will be held in London on July 11. Mr. R. Ellerton Binns is chairman.

**Seltrust's Profits.**—Seltrust Investments, a Selection Trust major subsidiary, earned a sharply increased profit of £1,716,786 in the year to March 31, 1957 (1956, £1,118,987), and the proposed dividend reflects this in rising to 87s. 6d. from last year's 55s. Net current assets totalled £260,505 while reserves increased from £524,453 to £578,239. Although quoted investments remain in the balance sheet at the 1956 figure of £2,141,720, their market value decreased by almost £4,000,000 to £17,597,909. The meeting

will be held in London on July 11 when Mr. A. Chester Beatty will be in the chair.

**Warning From Selection Trust.**—In spite of 50 per cent increase in gross revenue in the year which ended last March the directors of Selection Trust have thought it necessary to warn members that revenue in the current year may be lower. It is felt, however, that

the Board will be able to maintain the 70 per cent distribution recommended for 1956/57. Investments appear in the accounts at £5,199,190 and the market value of the £3,632,483 quoted investments was £21,216,619. Revenue reserves and surplus are almost 50 per cent over the 1956 figure at £3,319,481. Mr. A. Chester Beatty is chairman. The annual meeting will be held in Selection Trust Building on July 11.

## The Mining Journal—June 21, 1957

### BRITISH-BORNEO PETROLEUM SYNDICATE

#### RECORD REVENUE

The forty-third annual general meeting of the British-Borneo Petroleum Syndicate Limited was held on June 12 in London, Mr. Campbell L. Nelson, the Chairman, presiding.

In the course of his speech, the Chairman said:—

The Profit and Loss Account shows that the revenue for the year amounted to £375,000 a record for the Company. Whilst the royalty from Brunei oil production remains the largest contribution to our revenue, our other sources of income, mainly dividends and interest, have provided a steadily growing figure over the years and reflect our policy of retaining a sizeable part of each year's profit and reinvesting it mainly in Oil and Mining Companies. In accordance with this policy we have invested approximately three-quarters of the profits retained for the year under review.

The net profit for the year was £158,000. We have appropriated £35,000 to General Reserve, £20,000 to Investment Reserve, and we now recommend the payment of Dividend No. 49 of 1s. 6d. free of Income Tax per unit of Stock, which will take £100,000. The dividend will be paid on July 4 next on the larger capital, representing an increase of 21% in the cash receivable by the Stockholders.

#### Jerudong Discovery

Our oil interests in British Borneo consist of the right to receive a royalty on all oil production by British Malayan Petroleum Company—a member of the Shell Group—in the State of Brunei and on any oil production which may be obtained in the Klias Peninsula in British North Borneo. We may expect that this royalty will continue to be substantial.

Members were informed last year that the British Malayan Company had discovered oil at Jerudong in the State of Brunei, approximately 40 miles from the Seria oilfield. It has been announced that subsequent operations have not added to the original discovery but that a further well is in course of drilling.

In recent years the drilling operations of the British Malayan Company have been extended under the sea adjoining the coast of Brunei and we have received our royalty on the production so obtained. It has been reported that drilling has been taking place on the Continental Shelf, some 25 miles off the coast of Brunei. We are discussing with the Shell Group the question of seeking an interpretation from the Courts as to whether under the terms of our Agreement we shall be entitled to a royalty on any production which the Shell Group may obtain from the Continental Shelf.

#### Quoted Investments

The greater part of our Quoted Investments lies in the Oil Industry which has continued its growth and prosperity; our oil interests include holdings in Apex (Trinidad), British Petroleum, Burmah Oil, Canadian Eagle and Shell. In addition we have a number of general investments. The following is an analysis of our quoted investments based on the Stock Exchange valuation at the date of our Balance Sheet. Oil Companies 72%, Mining Finance and Mining Companies 14%, Home Industrials 8%, American and Canadian Securities 6%. The Stock Exchange value of these investments is substantially in excess of the amount at which they are included in the Balance Sheet.

The report and accounts were unanimously adopted.

#### RECENT INTERIM DIVIDEND ANNOUNCEMENTS

Company	Year ending	Dividends latest	Date payable	Total
		%	%	%
Kramat Dredging ..	.. 31. 3.57	30	Nil	July 10 Nil
Apex (Trinidad) ..	.. 30. 9.57	10(a)	5	July 24 35
Vereeniging Est. ..	.. 31.12.57	12½	12½	July 1 32½
Amal. Collieries S.A. ..	.. 31.12.57	7½	7½	June 30 20
British Tin Investment ..	.. 31.12.57	6½	7	Aug. 20 28
Rooiberg Minerals ..	.. 30. 6.57	10	Nil	July 1 Nil
Cons. Murchison ..	.. 31.12.57	75	100	— 250
Tekka Ltd. ..	.. 31. 3.57	1½	1½	July 5 5½
Malayan Tin ..	.. 30. 6.57	7½	6½	July 30 40
S. Malayan Tin ..	.. 30. 6.57	5	6½	July 26 33½
Tronoh Mines ..	.. 31.12.57	10	7½	July 16 47½
S. Tronoh ..	.. 31.12.57	10	7½	July 15 27½
C. Diamond M. S.W.A. ..	.. 31.12.57	50	50	Aug. 16 150
Springbok Coll. ..	.. 31.12.57	12½	12½	June 30 32½
Broken Hills ..	.. 30. 6.57	80(b)	80(b)	June 28 170(b)
North Broken Hill. ..	.. 30. 6.57	80(b)	80(b)	June 26 210(b)

(a) To reduce disparity between interim and final.

(b) Not as given in issue of May 31.

**CABLE BELT CONVEYOR,** width 36 in., length head to tail drum 3,067 ft., lift 360 ft., speed 250 f.p.m., capacity 300 tons p.h., 150 h.p. motor. Available August. For full specifications apply to Logan, Great North Road, Muir of Ord.

#### GEOLOGIST REQUIRED BY MUFULIRA COPPER MINES LIMITED, NORTHERN RHODESIA

Applicants must be graduates of a recognized University or holders of equivalent diploma in geology with at least one year's full-time practical experience. An aptitude for research and ability to marshall and present data in a clear and concise form are essential. A good basic salary depending on qualifications and experience plus variable bonus at present 50 per cent on basic salary and cost of living allowance currently £80 p.a. Also generous pension, life assurance and medical schemes. Free outward passage for employee. Leave at 48 days p.a. may be accumulated up to 144 days. Applications, giving personal particulars and details of training and experience, should be made to R.26, Mine Employment Department, Selection Trust Limited, Mason's Avenue, London, E.C.2.

#### NATIONAL COAL BOARD DURHAM DIVISION PLANNING ENGINEER, GRADE 4

Applications are invited for the above post in No. 6 (North-West Durham) Area.

Salary will be within the Range £950 to £1,450.

The successful applicant will be responsible for detailed planning within Planning Groups, mainly in connection with short-term planning and face layout.

**APPLICATIONS**, giving full details, should be submitted within 7 days to: No. 6 Area Staff Manager, National Coal Board, Durham Division, Springfield House, Shotley Bridge, Co. Durham.

#### PLANNERS GRADE 5

Applications are invited for the above post in 2 Groups of No. 5 (Mid-West Durham) Area.

Salary will be within the Range £750 to £1,100.

The successful applicants will be required to perform planning tasks under the supervision of the Senior Planning Engineer.

**APPLICATIONS**, giving full details, should be submitted within 7 days to: No. 5 Area Staff Manager, National Coal Board, Durham Division, Beamish Hall, Stanley, Co. Durham.

